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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,991	07/21/2003	Volker Formanski	8540G-000163	5491

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EXAMINER
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PARSONS, THOMAS H

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/623,991	<b>Applicant(s)</b> FORMANSKI ET AL.	
	<b>Examiner</b> Thomas H. Parsons	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benz et al. (5,645,950) in view of Scheffler et al. (4,859,545).

**Claim 1:** Benz et al. in Figure 1 disclose a fluid flow system to adjust a humidity of a gas supplied in a fuel cell system, comprising:

a fuel cell stack (12) having a cathode inlet and a cathode exhaust (col. 2: 8-12);  
a compressor (6) that draws in fresh gas (3) and compresses the gas therein; and  
an injector (10) injecting water into the gas within the compressor, the compressor supplying the gas to the cathode inlet. See col. 2: 8 - col. 3: 15, and col. 3: 48 - col. 4: 12.

Benz et al. do not disclose a compressor that draws in a mixture of fresh gas and humidified exhaust gas from the cathode exhaust and compresses the mixture therein.

Scheffler et al. in Figure 1 disclose a cathode exhaust recycle loop (24) extending from the cathode exhaust line (20) to the cathode inlet line (18). See col. 2: 9 - 50.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Benz et al. by incorporating the cathode

Art Unit: 1745

exhaust recycle loop of Scheffler et al. because Scheffler et al. teach a cathode exhaust recycle loop that would have lessened or eliminated the incidence of oxygen starvation of individual cells in a stack at lower power levels thereby improving the overall performance of the entire stack.

Further, the Benz et al. combination would obviously provide the claimed compressor that draws in a mixture of fresh gas and humidified exhaust gas from the cathode exhaust and compresses the mixture therein and provide water injection into the mixture.

**Claim 2:** The rejection of claim 2 is as set forth above in claim 1 wherein further Scheffler et al. in Figure 1 discloses a metering device (variable speed blower 10) to adjust a flow of cathode exhaust gas to the compressor. See col. 2: 32-34.

**Claims 3-6:** The limitations set forth therein have been considered, and construed as process limitations that add no additional structure to the Benz et al, combination. Further, because the Benz et al. combination is structurally the same as instantly claimed, it appears capable of providing the claimed process limitations.

**Claim 7:** The rejection of claim 7 is as set forth above in claim 1 wherein further Benz et al. in Figure 1 disclose a controller (11) controller that controls the injector and the compressor to adjust the humidity (col. 3: 48 – col. 4: 15). Scheffler et al. in Figure 1 disclose a metering device (variable speed blower 10) to adjust a flow of cathode exhaust gas to the compressor (col. 2: 32-34), and a controller (34) that controls the metering device (28)(col. 2: 44 - col. 3: 9). The Benz et al. combination would obviously provide the claimed controller that controls the metering device, the injector and the compressor to adjust the humidity.

Art Unit: 1745

**Claim 8:** The rejection of claim 8 is as set forth above in claim 1 wherein the Benz et al. combination would obviously provide a method of regulating a humidity of a cathode supply gas to a cathode side of a fuel cell stack, comprising:

mixing the cathode supply gas with a feedback gas from the cathode side to effect a relative humidity of the cathode supply gas;

injecting water into the cathode supply gas to further effect the relative humidity of the cathode supply gas; and

compressing the cathode supply gas in a compressor.

**Claim 9:** The rejection is as set forth above in claim 8 wherein further the Benz et al. combination discloses that the cathode supply gas is air. See Benz et al., Figure 1, air supply line 3, and Scheffler et al., Figure 1, blower 30 for supplying cathode air via cathode inlet 18.

**Claim 10:** The rejection is as set forth above in claim 8 wherein further Benz et al. disclose vaporizing the water within the compressor (col. 3: 4-6).

**Claim 11:** The rejection is as set forth above in claim 8 wherein further Benz et al. disclose that vaporizing is achieved using heat generated through compression (col. 3: 4-6).

**Claim 12:** The rejection is as set forth above in claim 8 wherein further Benz et al. disclose adjusting a compression pressure of the compressor based on a quantity of water to vaporize the water therein (col. 3: 63- col. 4: 5).

**Claim 13:** The rejection of claim 13 is as set forth above in claim 8. In light of the teachings in Benz et al. and Scheffler et al. to a controller for controlling the entire fuel cell system, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the controller of the Benz et al. combination to provide for

Art Unit: 1745

adjusting a flow of the feedback gas based on a desired relative humidity of the cathode supply gas.

**Claim 14:** The rejection of claim 14 is as set forth above in claim 1 wherein the Benz et al. combination would obviously provide a method of regulating a relative humidity of a gas supplied to a cathode side of a fuel cell stack, comprising:

controlling a flow of feedback gas from the cathode side to a compressor to adjust the relative humidity of the gas (see claim 13 above);

vaporizing water in the compressor to further adjust the relative humidity of the gas (Benz et al. disclose vaporizing the water within the compressor (col. 3: 4-6).;

and discharging the gas at a pressure sufficient for use in the fuel cell stack.

**Claim 15:** The rejection is as set forth above in claim 8 wherein further Benz et al. in Figure 1 disclose injecting water (10) into the compressor. Benz et al. disclose that the water may be injected upstream of the compressor which has been construed as providing water injection into the compressor.

**Claim 16:** The rejection is as set forth above in claim 8 wherein further Benz et al. disclose that vaporizing is achieved using heat generated through compression (col. 3: 4-6).

**Claim 17:** The rejection is as set forth above in claim 8 wherein further Benz et al. disclose adjusting a compression pressure of the compressor based on a quantity of water to vaporize the water therein (col. 3: 63- col. 4: 5).

**Claims 18 and 19:** The rejection is as set forth above in claim 8 wherein the Benz et al. combination discloses a feedback gas but is silent as to a saturated or super-saturated feedback (i.e. recycled cathode exhaust gas). However, because the method of the Benz et al. combination

Art Unit: 1745

is the same as that instantly claimed, it would obviously provide a saturated or super-saturated feedback.

**Claim 20:** The rejection is as set forth above in claim 1 wherein the Benz et al. combination would obviously provide a method of regulating a relative humidity of a gas, comprising:

controlling a flow of feedback gas to a compressor to adjust said relative humidity of said gas (see claim 13 above); and

vaporizing water injected into the compressor to further adjust the relative humidity of the gas Benz et al. disclose vaporizing the water within the compressor (col. 3: 4-6).

**Claims 21 and 22:** The rejection of claims 21 and are as set forth above in claims 18 and 19.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas H Parsons  
Examiner  
Art Unit 1745

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